

**STACKABLE SHIPPING AND DISPLAY BOX****Technical Field:**

This invention relates to packaging, and more particularly to a stackable shipping and display box.

**5 Background Art:**

Many products are shipped in cartons or boxes that enable the product to be displayed in the shipping box at the point of sale. These types of boxes are particularly suitable for products sold in club stores, where many products, e.g., juices, typically are packaged in one-gallon containers. Conventional boxes for handling one-gallon containers usually comprise full depth closed RSC's, although partial depth boxes or trays are sometimes used. A divider that extends between the containers normally is used in the partial depth trays to provide adequate strength. Further, conventional boxes for holding one-gallon containers are commonly designed for holding six containers, although some packages, such as those shown in figures 1 and 2, are designed for holding four containers, primarily due to weight concerns. These conventional boxes are square in plan view, with the one-gallon containers orthogonally oriented in side-by-side relationship to one another.

To facilitate handling, it is common practice to stack several layers of filled boxes on a pallet, and sometimes to stack two or more pallets high. Conventional square boxes are often column stacked, and typically require internal or external support to eliminate or reduce load on the bottles. Column stacking of the boxes is inherently unstable, and layer sheets, or slip sheets, may be employed between adjacent layers of boxes to improve the stability of the stacked boxes.

Moreover, the pallets used typically have dimensions of 48X40 inches, and the square boxes do not utilize the pallet space well, i.e., a plurality of the boxes placed in a layer either do not occupy the entire pallet space, or they overhang the pallet, depending upon how the boxes are oriented and how many are placed in a layer on the pallet. Conventional square boxes do not permit any arrangement of the boxes on a pallet that will

result in the footprint of the area occupied by the boxes being substantially equal to the shape and area of the pallet. When conventional square boxes holding four one-gallon containers are placed on a conventional 48X40 inch pallet, often only nine boxes, or thirty-six one-gallon containers, can be accommodated in each layer of boxes without  
5 overhanging the edges of the pallet, depending upon the bottle diameter and/or footprint.

Accordingly, there is need for a box for shipping and displaying product, wherein the box, when filled with containers of product, has a maximum desired weight and is configured to enable stable stacking of filled boxes, pallet space is optimally utilized, and no load is produced on the product containers, all without requiring the use of separate  
10 layer sheets, or separate internal or external reinforcements.

**Disclosure of the Invention:**

The present invention comprises a box for shipping and displaying product, wherein the box is configured so that filled boxes can be stacked in stable, interlocked  
15 relationship, pallet space is optimally utilized, and the product containers are not subjected to load when filled boxes are stacked on top of one another.

To accomplish the foregoing, the box of the invention is rectangular, i.e., has a greater length than width, and containers of product are placed in the box in diagonally offset side-by-side relationship to one another. The diagonally offset placement of the  
20 containers results in interior spaces at two diagonally opposite corners of the box, and angled corner panels extend into these spaces to contact the containers to help retain them in the box and to provide stacking support and prevent vertical loads on the containers.

The rectangular shape of the boxes enables boxes in adjacent layers to be cross-stacked and interlocked for stable stacking. Boxes incorporating the invention can be  
25 stably stacked two or more pallets high and without imposing a vertical load on the containers.

Although the boxes could be configured to hold different numbers and sizes of containers and still incorporate the features of the invention, in the particular embodiments illustrated and described herein they are sized to hold four one-gallon containers. These  
30 boxes can be placed on a conventional 48X40 inch pallet so that the footprint of the area

occupied by a layer of boxes is substantially the same as the area of the pallet surface. With the invention, eleven boxes holding forty-four containers can be placed in a layer on a 48X40 inch pallet, although it should be understood that these numbers can vary, depending upon the bottle diameter and footprint.

5           Additionally, empty containers, e.g., bottles, can be inverted and placed upside down in the box by the bottle manufacturer for shipment to a facility for filling the bottles. The shape of the box, including the angled corner panels, securely holds the inverted empty bottles in place even when some of the side walls have a reduced height to define openings through which the bottles are visible.

10           Further, the box of the invention, including the angled corner panels, can be made from a single unitary blank of corrugated board, and when loaded with four one-gallon containers of juice, for example, has a case weight less than 40 pounds. In an alternate embodiment, the angled corner panels can be formed from separate pieces inserted into the box.

15           The box of the invention is equally suitable for use with containers having a round cross-section or a non-round cross section, e.g., square.

#### **Brief Description of the Drawings:**

20           The foregoing, as well as other objects and advantages of the invention, will become apparent from the following detailed description taken in conjunction with the accompanying drawings, wherein like reference characters designate like parts throughout the several views, and wherein:

25           Figure 1 is a top perspective view of conventional partial depth square boxes or trays filled with four containers placed side-by-side in orthogonal relationship relative to one another and column-stacked on a pallet.

            Figure 2 is a top perspective view of a single prior art box conventionally filled with four containers disposed in side-by-side orthogonal relationship to one another, and showing an H-shaped divider in dot-and-dash lines.

30           Figure 3 is a top plan view depicting how conventional square boxes designed for holding four one-gallon containers occupy the space on a conventional 48X40 inch pallet.

Applicant: Weimer Jr., Charles P.  
Assignee: International Paper Company  
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Figure 4 is a top perspective view of rectangular boxes according to the invention filled with containers placed in offset side-by-side relationship relative to one another and cross-stacked on a pallet in interlocking relationship.

5 Figure 5 is a top perspective view of a single rectangular box according to the invention filled with four containers disposed in side-by-side offset relationship to one another.

Figure 6 is a top plan view depicting how rectangular boxes according to the invention and designed for holding four one-gallon containers occupy the space on a conventional 48X40 inch pallet.

10 Figure 7 is a top plan view depicting how the rectangular boxes of the invention might be alternately arranged on a pallet.

Figure 8 is a top perspective view of a first embodiment of a box according to the invention, showing four containers of round cross-section disposed therein in offset relationship to one another, and wherein the box is made from a single unitary blank, with  
15 two side walls of substantially reduced height.

Figure 9 is a top plan view of a blank for making the box of figure 8.

Figure 10 is a top plan view of the box of figure 8.

Figure 11 is a top perspective view of the box of figure 8, showing four inverted containers placed therein in upside-down, offset relationship.

20 Figure 12 is a top perspective view of a second embodiment of the box of the invention, wherein the box is constructed substantially the same as the box of figure 8, except that the side walls are only partially reduced in height.

Figure 13 is a top plan view of a blank for making the box of figure 12.

Figure 14 is a top perspective view of a third embodiment of the box of the  
25 invention, wherein the box is constructed substantially the same as the box of figure 8, except that the side walls are not reduced in height.

Figure 15 is a top plan view of a blank for making the box of figure 14.

Figure 16 is a top perspective view of a fourth embodiment of the box of the invention, wherein the box is made from one blank, the angled corner pieces comprise

inserts made from additional blanks, and wherein the side walls and end walls are all of reduced height.

Figure 17 is a top plan view of a blank for making the box of figure 16.

Figure 18 is a top plan view of a blank for making the inserts used in the box of  
5 figure 16.

Figure 19 is a top plan view of the box of figure 8, with containers having a square cross-section therein.

Figure 20 is a top perspective view of a fifth embodiment of the box of the invention, wherein the reduced height side walls are defined by cut-outs in full height  
10 panels forming those side walls.

Figure 21 is a top plan view of a blank for making the box of figure 20.

Figure 22 is a top perspective view of an alternate embodiment of a box incorporating the invention, wherein one end wall is cut away to produce an opening through which the containers are visible.

Figure 23 is a top perspective view showing a plurality of the boxes of figure 22 placed on a pallet, and showing how the footprint of the area occupied by the boxes is substantially the same as the area of the pallet surface.

#### **Description of the Preferred Embodiments:**

20 A conventional box of square shape designed for holding four one-gallon containers **C** is shown at **10** in figures 1-3. In accordance with conventional practice, the containers are placed in the box in orthogonally disposed side-by-side relationship to one another, and an H-shaped divider **11**, shown in dot-and-dash lines, is placed in the box between the containers. Boxes filled with containers are typically stacked in layers on a  
25 pallet **P**, and as depicted in figures 1 and 2, the boxes are stacked on top of one another in columnar relationship. This arrangement is unstable, and layer sheets (not shown) are commonly placed between adjacent layers. Moreover, only nine boxes may be placed in a layer without producing pallet overhang, but this results in a substantial area of the pallet not being used.

The invention solves this problem, as depicted in figures 4-7, by making the boxes **12** rectangular in shape, with a greater length dimension **L** than width dimension **W**, and placing the containers **C** in the box so that they are in offset or staggered relationship, as seen best in figures 5 and 6. With this arrangement, the boxes may be cross-stacked in interlocking relationship to produce a stable stack without requiring the use of layer sheets. Moreover, the boxes may be arranged on the pallet **P** so that the footprint or area occupied by the boxes is substantially equal to the surface area of the pallet, thus enabling optimum pallet utilization.

The boxes may be arranged in different ways to achieve interlocking when stacked and to maximize use of the pallet surface, as depicted for example in figures 6 and 7.

A second embodiment of a box according to the invention is shown at **14** in figures 8-11 and 19. The box **14** has a bottom wall **15**, opposite end walls **16** and **17**, opposite side walls **18** and **19**, and angled interior corner panels **20** and **21** extending across the interior of the box from a respective side wall to an adjoining end wall at each of two diagonally opposite corners of the box, defining a generally parallelogram-shaped box interior, as seen best in figure 10.

Large openings **22** and **23** are formed in the side walls, extending from the top of the wall to an upstanding, narrow, bottom side wall segment **24** at the bottom of the opening, and offset slightly toward respective opposite ends of the box, defining a narrow first side wall end segment **25** at one end of the side wall, and a relatively wider second side wall end segment **26** at the other end of the side wall. The angled interior corner panels are foldably joined at one edge **27** to the respective second side wall end segments at the edge of the respective openings **22** and **23**, and are affixed to the adjacent end wall by a glue flap **28** on the opposite free edge of the corner panel.

When four one-gallon containers **C** are placed in the box, they are oriented in nested, offset or staggered relationship as depicted in figures 5, 6 and 8. The containers, and thus labels or graphics on the containers, are visible through the large openings **22** and **23**, and the containers are retained in the box by the upstanding narrow bottom side wall segment **24**, the angled interior corner panels **20** and **21**, and the narrow first side wall end segment **25**.

The interior corner panels **20** and **21** and adjacent side and end wall portions define triangular reinforcing structures at two diagonally opposite corners of the box, lending stacking strength to the box and enabling boxes filled with containers to be stacked two or more pallets high without imposing load on the containers.

5           A blank **B<sub>1</sub>** for forming the box of figures 8 and 10 is shown in figure 9, and comprises a single unitary piece of corrugated board that is die-cut and scored to form an elongate, rectangular center panel **30** that forms the bottom wall **15** in the erected box. First side wall panels **31** and **32** are foldably joined to opposite side edges of the bottom-forming panel **30**, and define the bottom side wall segments **24** in the erected box. End-  
10 wall-forming panels **33** and **34** are foldably joined to opposite ends of the bottom-forming panel **30**, and a second side wall panel **35** is foldably joined along one edge of each panel **33** and **34** to form the narrow first side wall segments **25** in the erected box. Relatively wider third side wall panels **36** and **37** are foldably joined along one edge to the opposite side edges of the panels **33** and **34**, and form the second, wider side wall segments **26** in  
15 the erected box. Corner panel-forming panels **38** and **39** of greater width than the panels **36** and **37** but narrower than panels **30-34** are foldably joined along one edge to the panels **36** and **37** and form the angled interior corner panels in the erected box. Narrow flaps **40** and **41** are foldably joined to the opposite edges of panels **38** and **39** and form the glue flaps **28**. In the erected box, the glue flaps **28** are adhesively secured to an interior surface  
20 of the adjacent end wall, and the flaps **31** and **32** are folded upwardly and glued to an outer surface of the respective side end wall segments **25** and **26**.

It will be noted that a continuous score **42** extends along the length of the blank at opposite sides of the bottom-wall-forming panel **30** and the end-wall-forming panels **33** and **34**, and in the particular example shown, short cuts **43** are spaced along these scores.  
25 Further, in the particular example shown, the scores **44** separating the panels **36** and **38** and the panels **37** and **39**, and the scores **45** separating the panels **38** and **40** and the panels **39** and **41** comprise lines of perforations **46**. It should be understood, however, that the cuts and perforations need not be employed and the scores could comprise creased areas.

As indicated in figure 11, the containers **C** may be inverted and placed upside down  
30 in the box **14**, where they are retained by the angled corner panels **20** and **21**, the bottom

side wall segment **24** and the narrow side wall segment **25**. This feature enables the container manufacturer to place empty containers in the box for shipment to a facility where the containers are to be filled.

A third embodiment of the box of the invention is shown at **50** in figure 12. This embodiment is substantially the same as the first embodiment **14** described above, except the bottom wall segments **51** and **52** are substantially wider, resulting in effectively higher side walls and a smaller opening through the side walls, and the glue flaps **53** that attach the free edge of the angled interior corner panels **54** and **55** to the adjacent end walls are wider, extending all the way into the opposite corner of the box.

A blank **B<sub>2</sub>** for forming the box of figure 12 is shown in figure 13, and is essentially the same as the blank **B<sub>1</sub>** described above, except for the wider panels **56** forming the bottom side wall segments **51** and **52**, and the wider panels **57** forming the corner panel glue flaps **53**.

A fourth embodiment of the box of the invention is shown at **60** in figure 14, and is essentially the same as the first embodiment **14** described above, except that the side walls **61** and **62** are full height, with no opening or cut-out in them.

A blank **B<sub>3</sub>** for forming the box of figure 14 is shown in figure 15, and is essentially the same as the blank **B<sub>1</sub>** described above, except for the width of side wall panels **61** and **62**, which have the same width as the height of the end walls.

A fifth embodiment of the box of the invention is shown at **70** in figure 16. In this embodiment, separate inserts **71** and **72** of triangular cross-section are inserted into two diagonally opposite corners of a partial depth rectangular box or tray **73** similar to the box **12** shown in figures 4-6. The box **73**, taken alone, is of substantially conventional construction and can be used for many purposes. It has side and end walls **74** and **75** of equal height, but only about one-half the height of the containers **C** placed in the box. In accordance with the present invention, the inserts **71** and **72** project above the height of the side and end walls and slightly above the height of the containers.

A blank **B<sub>4</sub>** for forming the box **73** is shown in figure 17, and comprises four rectangular panels **76**, **77**, **78** and **79** foldably joined together along spaced transverse score lines **80**. A glue tab **81** is foldably joined to a panel **79** at one end of the blank for adhesive



attachment to the panel **76** at the opposite end of the blank when the box is erected. Bottom forming flaps **82, 83, 84** and **85** are foldably connected along one edge of the respective side-wall-forming panels **76, 77, 78** and **79**.

5 A blank **B<sub>5</sub>** for forming the triangular corner inserts **71** and **72** is shown in figure 18 and comprises first, second and third panels **86, 87** and **88** joined along scores **89**.

In figure 19 a plurality of containers **C'** of square cross-section are shown placed in the box **14** of figures 8-11. This capability exists for all embodiments of the invention. This figure also clearly shows how the containers are retained in place in the box in spite of the large openings through the side walls.

10 A sixth embodiment of the box of the invention is shown at **90** in figure 20. This embodiment is similar to the embodiment of figure 8, except the panels **91** and **92** foldably joined to opposite side edges of the bottom-forming panel **30** have a width to extend the full height of the box, and shaped cut-outs **93** are formed in them to provide the openings through which the containers are visible. This arrangement also produces a double  
15 thickness side wall **94** in the area between the respective angled interior corner panels **20** and **21** and the adjacent end walls.

A blank **B<sub>6</sub>** for forming the box **90** is shown in figure 21. This blank is the same as the blank **B<sub>1</sub>** shown in figure 9, except for the panels **91** and **92** and the cut-outs **93** in these panels.

20 A seventh embodiment **100** is shown in figures 22 and 23, and is similar to the embodiment shown in figures 4 and 5, except in this embodiment the side walls **101** and end walls **102** have a height greater than the height of containers **C** placed in the box, and a cut-out **103** is formed in one end wall.

25 While particular embodiments of the invention have been illustrated and described in detail herein, it should be understood that various changes and modifications may be made to the invention without departing from the spirit and intent of the invention as defined by the scope of the appended claims.

WHAT IS CLAIMED IS: